

September 20, 1996

Dr. John Sheffield
Chair, Fusion Energy Sciences
Advisory Committee
Oak Ridge National Laboratory
Bethel Valley Road
Oak Ridge, Tennessee 37931

Dear Dr. Sheffield

In January 1996, the Fusion Energy Advisory Committee (FEAC) provided recommendations to the Department of Energy on how to restructure the fusion program in the light of congressional guidance and budget realities. The Department endorsed these recommendations and prepared a strategic plan to implement them. The FEAC report containing the recommendations concluded that the goals of the restructured program could most effectively be accomplished at a funding level of \$275 million per year, including the Federal government management costs.

The Department requested that Congress appropriate \$255.6 million in Fiscal Yew 1997 for the fusion energy sciences program exclusive of the Federal government management costs of about \$8 million. This level of funding was judged sufficient to accomplish the goals of the FEAC recommended program.

On September 11, 1996, the Energy and Water Development Conference Committee sealed on a Fiscal Yew 1997 appropriation for the fusion energy sciences program of \$232.5 Million. Because this appropriation is \$39.5 million less than the \$275 million nominal funding level assumed in the strategic plan, I would like the Fusion Energy Sciences Advisory Committee to suggest how the program described in the strategic plan could be changed to make it consistent with the \$232.5 million appropriation.

I would like to have your comments and suggestions in written form by the end of your meeting on September 25, 1996. Enclosed is a strawperson distribution of the available funds from which you should start your deliberations.

I look forward to meeting with you on this subject in late September.

Sincerely,

Martha A. Krebs
Director
Office of Energy Research

October 3, 1996

Dr. Martha A. Krebs, Director
Office of Energy Research
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Dr. Krebs:

The Fusion Energy Sciences Advisory Committee (FESAC) has addressed, in part, the charge in your letter to the Committee dated September 20, 1996. You asked the Committee to suggest how the program described in the Department's Strategic Plan (1996) for the Fusion Energy Sciences Program might be changed to make it consistent with the \$232.5 million appropriation. The Department had requested that Congress appropriate \$255.6 million in fiscal year 1997 for the Fusion Energy Sciences program, exclusive of the Federal Government management costs of about \$8 million to accomplish the goals of the plan recommended by the Fusion Energy Advisory Committee (FEAC, as FESAC was named prior to August, 1996) [1].

The Department presented a provisional budget distribution at the meeting. Given the short time available to comment, we addressed, in part, the charge in terms of recommended changes to the provisional budget and its presentation.

In making these recommendations, the FESAC took into account the valuable input of the Department and of numerous members of the fusion community who gave presentations or provided written information. Enclosed is a list of the contributors.

The FESAC has a few general comments. All of the program elements shown in the provisional budget are important to the future of the program. The budget reduction from Fiscal Year 1996 to 1997 is very hard to handle. With some exceptions, as outline below, FESAC generally agrees with the Office of Fusion Energy Sciences response to this difficult situation. Any help you can give to alleviate the budgetary problems would be very valuable in optimizing the new program.

The FESAC reaffirms, unanimously, the importance of proceeding expeditiously to implement the restructured program defined by FEAC. We believe, however, that the fusion community needs to do further work on refining the vision and long-term goals of the program, including a clearer explanation of the approach to the fusion energy goal and an implementation plan.

A majority of the Committee feels that the provisional budget is generally responsive to the restructuring recommended by FEAC. However, there are concerns in two areas: first, the budget gives the perception of less responsiveness than is the reality; second, some elements important to the figure program need greater emphasis.

The perception issue should be addressed by structuring the budget entries to indicate, more clearly, the changes in direction. In the same way, the extent of national and international collaboration in the various program elements should be made more visible.

The FESAC recommends that the Princeton Plasma Physics Laboratory, in conjunction with the Department, should redirect some of the effort within the budget labeled "TFTR" to emphasize more clearly the transition to its future program. This can include new initiatives, as well as increased domestic and international collaborations.

The Committee generated for itself a list of 18 questions, to address the issue of the program balance as reflected in the provisional budget. Based on the answers to these questions, a majority of the Committee (as indicated) was in agreement on the following issues. For each of the questions, the vote of the 14 members and 3 ex-officio members present (excluding the Chair) is given:

- Is the Tokamak Physics budget at the current level: slightly too high (11); roughly correct (3); or slightly too low (2); [insufficient information (1)]?
- Is the Alternative Concepts Physics budget at the current level: slightly too high (2); roughly correct (7); slightly too low (8)? (Note: at the time the question was posed, the alternative concepts category did not include IFE.)
- Should IFE (Inertial Fusion Energy) be placed in the Alternative Concepts category?

Yes (15); No (2).

- The IFE budget was reduced substantially. Should funds be restored: fully (4); partially (11); not at all (1); [insufficient information (1)]?
- Is the Fusion Theory plus Modeling budget at the current level: slightly too high (0); roughly correct (5); slightly too low (11); [insufficient information (1)]?
- Is the Basic Plasma Sciences budget: high (5); correct (12); or low (0)?
- The Base Technology programs (those outside the ITER line in FY96) were eliminated. Should funding be restored separate from ITER adjustments?
 - Plasma technologies (Magnetics, ECH, ICH, PFCs, Pellet Fueling): fully (0); partially (10); not at all (4); [insufficient information (3)].
 - Fusion technologies (Blankets, Tritium, Environment and Safety Remote

Handling, Containment Structures):
fully (0); partially (9); not at all (5); [insufficient information (3)].

- Should the OFES make an effort to ensure that plasma technologies capabilities are retained within the experimental programs to the extent that they are not funded elsewhere? Yes (13); No (2); abstain (1); [insufficient information (1)].
- Within the ITER budget, is the proposal of the DOE to restore the technology funding the correct approach? Yes (12); No (3); [insufficient information (1) or other
 - If the answer is yes, are the proposals: high (1); correct (7); low (2); or other (7)?
- The materials budget was cut substantially. Should funding be restored: fully (2); partially (10); not at all (4); [insufficient information (1)]?
- System Studies were cut substantially. Should funding be restored: fully (2); partially (7); not at all (5); [insufficient information (1) or abstain (2)]?
- Does the program take advantage adequately (systematically) of international collaboration beyond the effort in ITER? Yes (3); No (9); Don't know (5).
- Should OFES organize a retreat to better define the vision, goals and evolution of the program elements in the longer term program, including an analysis of how the necessary skills can be retained? Yes (16); No (0); Perhaps (1).

In summary, the Committee supported budget increments in the following areas (votes in parentheses):

IFE (13)
Base Technology (10)
Materials (9)
Modeling/Theory (8)
System Studies (5)
International collaboration (4)
Alternates (4)

Further details and comments are in the responses of the individual members on a few items that received limited support, and on reasons for the various choices.

No clear position of the Committee emerged for modifying the OFES budget proposal (as indicated) on the following issue:

- Is the combined ITER plus related technologies strawman budget at the correct level:
slightly too high (3); roughly correct (5); slightly too low (5); too low (1);
[insufficient information (3)]?

The FESAC recommends that to the extent possible the proposed budget increments should be met within your discretionary funding. To the extent that funds must be found within the program, the majority of the Committee recommends that budget adjustments should be handled by the Office of Fusion Energy Sciences and yourself, taking into account the sense that economies may be found in the tokamak experimental program [the Committee felt that this budget was slightly too high (11); roughly correct (3); slightly too low (2); insufficient information (1)]; and by allowing for the points of substantial agreement in the detailed comments made by the individual Committee members.

The FESAC recommends strongly that the Office of Fusion Energy Sciences should organize a retreat soon for members of the fusion community to define the goals of the longer term program and an implementation plan. In addition, a plan needs to be developed on how to sustain critical skills in the future program.

The FESAC is pleased at the extent of the Department's support for the program and hopes that its recommendations will help to optimize opportunities for the future success of Fusion Energy Sciences.

Sincerely,

John Sheffield, Chair
Fusion Energy Sciences Advisory Committee
on behalf of the members